

Reno Muschler and the identity of his African labiates

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A short biography of Reinhold Conrad (Reno) Muschler is provided, with emphasis on his botanical work and the scandal he caused in the botanical establishment of Berlin. A review of the attempts to rectify the irregularities in his publications is also provided. The author agrees with Muschler's colleagues in Berlin that Buscalioni's & Muschler's (1913) publication on new species of African plants purportedly collected in tropical Africa by the Duchess of Aosta is highly unreliable with respect to the data on provenance and collector of the type plants. Many are now believed to have in fact been collected by Schweinfurth in Eritrea and Yemen. However, in spite of the irregularities, the author argues that the types in this article should be cited in accordance with Muschler's original species description. The following nine species, described in the above-mentioned publication, and placed in Lamiaceae, are identified and found to be conspecific with the following species of Lamiaceae or Scrophulariaceae: *Coleus de-gasparisianus* Buscal. & Muschl. = *Plectranthus igniarius* Schweinf.; *C. helenae* Buscal. & Muschl. = *Plectranthus lanuginosus* (Hochst. ex Benth.) Agnew; *Geniosporum helenae* Buscal. & Muschl. = *Hebenstretia angolensis* Rolfe; *Lasiocorys de-gasparisiana* Buscal. & Muschl. = *Leucas nyassae* Gürke var. *nyassae*; *Ocimum superbum* Buscal. & Muschl. = *Ocimum spicatum* Deflers; *Orthosiphon de-gasparisianus* Buscal. & Muschl. = *Endostemon tereticaulis* (Poir.) M. Ashby; *Orthosiphon helenae* Buscal. & Muschl. = *Endostemon gracilis* (Benth.) M. Ashby; *Plectranthus emanueli* Buscal. & Muschl. = *Plectranthus longipes* Baker; *P. margeritae* Buscal. & Muschl. = *Plectranthus prostratus* Gürke. The names given after the equal-signs are to be used for the combined taxa. *Pycnostachys pseudospeciosa* Buscal. & Muschl. is accepted as the correct name of a species. The identity of *Sabaudia helenae* Buscal. & Muschl. is discussed. Neotypes and lectotypes of *Plectranthus igniarius* and most of Buscalioni's & Muschler's names of labiates are designated.

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Introduction

Reno Muschler, his life history and botanical work

In his biography, Plesske (1957) mentioned that Reinhold (Reno) Conrad Muschler was born in 1882, and was the only son of two singers at the Court Opera in Berlin. Initially,

he intended to work with music. When he was 20 years old it was discovered that he suffered from lung tuberculosis. During the winters of 1902-1903, 1903-1904 and 1905-1906, he stayed in Egypt in the hope that the dry desert air would improve his health. During these journeys, he came in contact with the well-known botanists Paul Ascherson and Georg Schwein-

furth, who encouraged him to study the flora of the country. In 1904, he started to study Botany under Adolf Engler; and in 1908, he completed his PhD in Berlin (on African *Senecio* species). Immediately after his graduation, he was employed as a scientific labourer and later as an assistant at the Botanical Garden and Herbarium in Berlin (B). However, he had to leave his position in September 1913 (Zepernick & Timler 1979). According to Plesske (1957), Reno Muschler had a nervous breakdown caused by overwork and lack of sleep, but there are also other explanations for his resignation (see below). He stayed in Egypt during the First World War, later returning to Germany and earning his living as a music reviewer at a newspaper and later as author of novels, short stories and biographies. Reno Muschler died in 1957 (Zepernick & Timler 1979).

Reno Muschler was indeed a very ambitious and productive member of the staff at Herbarium and Botanical Garden in Berlin (B). Between the years 1906 and 1914, he had written at least 18 botanical publications including a Flora, alone and in co-operation with L. Buscalioni, E. De Wildeman, E.F. Gilg, O. Hoffmann and G. Schweinfurth. According to Plesske (1957), he wrote 65 scientific contributions. Altogether, he and his co-authors have described 10 new genera, about 380 new species and many new taxa of lower ranks. They also made about 50 new combinations on species level. However, in 1913, the reliability of Reno Muschler's botanical work was seriously questioned by his colleagues in Berlin (B). Schweinfurth (1915) and Engler *et al.* (1915) examined some of his articles and accused him of fraud. According to Schweinfurth (1915: 206) and Engler *et al.* (1915: 366), Reno Muschler was brought to court, but the law-suit against him was dismissed because he was said to have been in a state of unconsciousness or mentally disturbed, and unable to control his free will at the time of the deed.

Seven months after Muschler had resigned from his position in Berlin, Moore (1914) published a description of a new genus of Asteraceae that he named *Muschleria*. Moore (1914) wrote: "The generic name has been adopted in recognition of the work, especially on Compositae, of Dr. Reno Muschler." It would be interesting to know whether Moore was unaware of the scandal, regarded Muschler as innocent, or wanted to honour Muschler in spite of the irregularities.

Evaluations of Reno Muschler's botanical works; attempts to rectify his errors and identify his taxa

Muschler's (1906, 1907a, 1907-1908, 1911a, 1912b) early publications are not known to contain falsifications, but comparatively many of the new taxa described in these articles are now placed in synonymy. According to Volkens in Engler *et al.* (1915: 367), Muschler's (1909, 1911b, 1911c, 1914) articles on Asteraceae contain many misidentifications and other types of errors. Several of his new species could not be evaluated as the types could not be found. Volkens in Engler *et al.* (1915) also pointed out that Reno Muschler had benefited from the fact that the expert on the family Asteraceae in Berlin (B), O. Hoffmann, had identified many specimens in the herbarium as representatives of new taxa, but had died without having published his findings. According to Täckholm & Täckholm (1941), Muschler's largest work, his Egyptian Flora (1912a), has great deficiencies. According to Schweinfurth (1915), Muschler's (1907b) Flora of El-Tor (on Sinai) is fraudulent. Whereas Muschler gave the impression that some of the work was based on his own observations, Schweinfurth (1915) claimed that Muschler had never visited Sinai.

Buscalioni & Muschler (1913) is by far the most problematic of Muschler's contributions. In this article, Muschler and his co-author described a large number of new species on

the basis of plants purportedly collected by the Italian Elena de Francia, Duchess of Aosta, or her travel companions during their journey in tropical Africa in 1909-1911. The dates and provenance of the cited type collections match the itinerary of the Duchess of Aosta's expedition, but according to Engler *et al.* (1915), most of these plants have in reality been collected elsewhere and by others. Many of them are believed to have been removed from Schweinfurth's herbarium and to have come from Eritrea and Yemen. Engler *et al.* (1915: 368-369) also pointed out that the species descriptions in this article (apart from those of the legumes) in reality were written by Muschler alone. Although Luigi Buscalioni stands as the first author, there are no reasons to believe that he had been involved in the falsifications. In their joint article (Engler *et al.* 1915), several of the botanists at the herbarium in Berlin (B) evaluated or tried to trace the origin and rectify of the new taxa in Buscalioni's & Muschler's (1913) article. The following botanists treated the following families: F.L.E. Diels (Iridaceae), A. Engler (Moraceae), E.F. Gilg (Capparaceae, Vitaceae, Ochnaceae, Melastomataceae and Cucurbitaceae), P. Graebner (Cyperaceae), H. Harms (Fabaceae), G. Lindau (Acanthaceae), T. Loesener & R. Schlechter (Lamiaceae), R. Schlechter (Scrophulariaceae) and G.L.A. Volkens (Asteraceae). According to Harms in Engler *et al.* (1915: 370), the descriptions of new species of legumes in this article, that in reality were written by Buscalioni, are unproblematic and really based on plants from the Duchess of Aosta's expedition. The same apparently also applies to *Dorstenia piscicelliana* Buscal. & Muschl. (see Engler in Engler *et al.* 1915: 370). The Orchids in the same article, that have Buscal. & Schltr. as author are apparently also unproblematic (see Croix & Cribb 1998: 508). However, according to Friis & Jellis (1984), the above-mentioned problems appar-

ently also apply to the Urticaceae in Buscalioni's & Muschler's article; the new species of that family were not investigated by Engler *et al.* (1915).

With reference to some old nomenclature rules, Engler *et al.* (1915: 366-367) claimed that many of plant names in Buscalioni & Muschler (1913) were invalid as they were meant to cause confusion by containing deliberately false data on collector and geographical origin. In accordance with this interpretation of the nomenclature rules, Gilg & Benedict (1915) regarded Buscalioni's & Muschler's four new species names of Capparaceae as invalid. However, their interpretation of these rules was questioned by Chiovenda (1916). Actually, according to the current botanical code (Greuter *et al.* 2000), plant names are not invalid for the reason given by Engler *et al.* (1915), but it is possible to propose rejection of these problematic names if they are found to have priority over other names of the same taxa. Buscalioni's & Muschler's plant names have been treated as valid in recent systematic works. The species names believed to have been based on material from north-east tropical Africa were included in Cufodontis' (1962, 1963, 1964, 1965, 1966, 1967) check-list.

According to White (1962: 184), some of the Duchess of Aosta's collections are preserved in Florence (FI or FT), but they have never been fully written up. He also mentioned that all but seven of Buscalioni's & Muschler's type specimens were destroyed in Berlin during the second world war. Fortunately, the species described by Buscalioni & Muschler (1913) have been illustrated, but many of the drawings are rather crude. As mentioned by Schubert & Troupin (1952, 1955), proofs of these drawings are deposited at the herbarium BR (in Brussels, now at Meise); most but not all of them were published by Piscicelli (1913). Many of the proofs (Fig. 1-5) carry the initials 'G.B.', but these initials do not appear on the illustrations

in Piscicelli (1913). On some labels attached to the herbarium sheets on which proofs are mounted, E. Robbrecht suggested that the proofs may have been sent by L. Buscalioni who corresponded with staff members at BR and met one of them in Berlin. However, it does also seem possible that the proofs have been received from Reno Muschler. The presence of an article (De Wildeman & Muschler 1913) shows that Reno Muschler co-operated with botanists in Brussels (BR). Schubert & Troupin (1952) were not able to identify the artist who had the initials GB. It seems possible that this artist is a woman called Miss Bartusch; she is mentioned in a letter from H. Harms (in Berlin) to E. De Wildeman (kept in the library at BR). Veldkamp (1968), Sebald (1980) and Friis & Jellis (1984) have identified some of Buscalioni's & Muschler's species of Oxalidaceae, Lamiaceae and Urticaceae by help of the proofs in BR or the illustrations in Piscicelli (1913). However, Ortiz & Rodriguez-Oubiña (1996) argued that the illustration of *Dicoma banguelensis* Buscal. & Muschl. (Asteraceae) was not drawn from the type of this species name.

The reliability of data in Buscalioni & Muschler (1913)

As seen in the following examples, the provenance data of the labiates described by Buscalioni & Muschler (1913) are in many cases contradicted, not only by Loesener & Schlechter in Engler *et al.* (1915), but apparently also by an independent source of information, the known distributions of the taxa on the proofs from BR (Figs. 1-5). If these illustrations are based on Buscalioni's & Muschler's (1913) type plants, and Buscalioni's & Muschler's data on their provenance is correct, about nine out of the 11 of their types were collected outside the otherwise known distribution area and/or altitudinal range of their species; five of these represent isolated records in disjunct species

distributions. These disjunct distributions do not match White's (1983) phytogeographical regions. According to Friis & Jellis (1984) and Ortiz & Rodriguez-Oubiña (1996), the purported types localities of *Pouzolzia piscicelliana* Buscal. & Muschl. [= *Australinia flaccida* (A. Rich.) Wedd., Urticaceae] and *Dicoma banguelensis* Buscal. & Muschl. (Asteraceae) are widely separated from the rest of the distribution area of their species. Disjunct species distributions are not very uncommon, but it is remarkable that such a large proportion of the studied material seems to constitute geographically marginal or disjunct isolates. Moreover, most of the localities indicated by Buscalioni & Muschler (1913), such as Broken Hill, have been visited by many plant collectors. It seems unlikely that so many plant collectors would have failed to find so many of the species, if they really had been present in these areas. Hence, I agree with Engler *et al.* (1915) and White (1962) that there are strong reasons to distrust Buscalioni's & Muschler's (1913) information on the provenance of their species.

There is also some disagreement between the illustrations on the proofs from BR and Loesener's & Schlechter's identifications in Engler *et al.* (1915) which may be explained by misidentifications. The possibly confused species (*Plectranthus longipes* and *P. hadiensis* plus *Hebenstretia angolensis* and *H. oetesii*) are superficially similar.

How should the types in Buscalioni & Muschler (1913) be cited

Cufodontis (1963, 1964, 1965), Jeffrey (1995: 27, 52) and Ortiz & Rodriguez-Oubiña (1996) have regarded the type material cited by Buscalioni & Muschler (1913) and the material to which these plants are believed to have belonged as parts of the same collections, although the two gatherings of plants have been given different collector's names and numbers.

For example, although the *von Aosta* 515 is cited as the type in the original description, Jeffrey (1995: 27) cited *Schweinfurth* 582 as the type of *Melothria pulchra* Buscal. & Muschl.; this was made on the basis of Gilg's correction in Engler *et al.* (1915: 373). I disagree with the above-mentioned authors' concept of what is a collection. I think that specimens with different collector's names and/or numbers should always be treated as separate collections, although they may be presumed to have belonged to the same original collection. This is particularly important as we cannot be completely sure that the Berlin botanists have matched all of "the Duchess of Aosta's" plants correctly when trying to trace their origin with the help of comparisons. Hence, despite the irregularities, we have to accept Buscalioni's & Muschler's own circumscriptions of their original material, and cite the types of their species as if they had been collected by "von Aosta". In normal cases, the collections from which Muschler's now destroyed "von Aosta" types are believed to have been removed, constitutes the most suitable material to serve as neotypes. However, under certain circumstances (see under *Coleus helenae* and *Plectranthus margeritae*), other collections may be more suitable as neotypes.

Identities of the labiates described in Buscalioni & Muschler (1913)

Buscalioni & Muschler (1913) described 11 new species and one new genus of Lamiaceae. Loesener & Schlechter in Engler *et al.* (1915: 371-372) regarded most of these descriptions as very problematic and tried to identify and trace the origin of these plants. However, their corrections do not seem to be unproblematic either. As mentioned by Chiovenda (1916), several of the so-called correct names are unpublished, and were apparently only known from the labels on some of Schweinfurth's collections. The labiates collected by Schweinfurth

were destroyed in Berlin along with Muschler's types, but duplicates of some of these specimens have been preserved in Geneva (G-BOIS). In some cases, Loesener's & Schlechter's identifications in Engler *et al.* (1915) do not match the descriptions in Buscalioni & Muschler (1913) and/or the illustrations on the proofs from BR. Due to these inconsistencies, it seems necessary to reconsider Loesener's & Schlechter's identifications with the help of the presently available sources of information: Buscalioni's & Muschler's (1913) descriptions, duplicates of some Schweinfurth's collections in G-BOIS, and the illustrations on the proofs from BR.

1. *Coleus de-gasparisianus* ("C. De Gasparisianus")

Buscalioni & Muschler (1913) claimed that the type of *C. de-gasparisianus* was collected at the "Mbusi River" (the Buzi River in Mozambique), and mentioned that the plant was a shrub that lacked leaves at the flowering time. They regarded it as closely related to *Plectranthus igniarius* (Schweinf.) Agnew but differing by lacking hairs and having 20-35 mm long petiole leaves. However, according to Loesener & Schlechter in Engler *et al.* (1915), the type of *C. de-gasparisianus* was removed from *Schweinfurth* 506 from the Haddes Valley in Eritrea, and belonged to *C. erythraeae* Schweinf. However, the latter name was never published. I have found no duplicates of Schweinfurth's collection, but Gürke, who was at the Berlin Herbarium (B) before Schweinfurth's herbarium was destroyed, has identified two collections at FT as *C. erythraeae*; these collections (*Ruspoli & Riva* 323 and 799) belong to *P. igniarius*. Apart from having leaves and flowers at the same time, the plant on the proof in BR (Fig. 1 Left) strongly resembles *P. igniarius*. *P. igniarius* is not known in Mozambique or Zimbabwe, but seems to be rather common in Eritrea. *P. igniarius* has mostly the leaves pubescent with

short hairs and less than 20 mm long pedicels, but the collection *Pappi* 2993 (at FT) from Mt. Dijot in Eritrea (not very far from the Haddes Valley) has very sparsely pubescent leaves with up to over 20 mm long pedicels. Pappi's collection lacks flowers, and *Schweinfurth & Riva* 1398 from a place not very far from Mt. Dijot, that has flowers but no leaves, is here chosen as neotype of *C. de-gasparisianus*.

Typification of Plectranthus igniarius

Schweinfurth (1867) did not indicate the collector's number of the type of *Coleus igniarius* (= *P. igniarius*), and the same applies to the other Schimper collections cited in his article. The original material was probably destroyed in Berlin. According to Cufodontis (1963), *Schimper* 527 is the type of this name, but specimens with that collection number have not been traced. The type of *P. malinvaldi* is based on material collected by the same collector (Schimper), the same day and at the same locality, but it has another collector's number (529). The same also applies to *Schimper* 1623, and a collection in Paris (P) is unnumbered. All this material may have belonged to the same collection, and the different numbers may have been added afterwards. Nevertheless, I find it advisable to regard these specimens as different collections. It cannot be decided which one of these three Schimper collections that is most close to the lost type in Berlin. Of the three collections, it is *Schimper* 529 that is the most widespread in the herbaria, but in order to avoid having two names attached to the same type collection, I designate *Schimper* 1623 as neotype of *P. igniarius*.

Conspectus of present taxonomy:

Plectranthus igniarius (*Schweinf.*) Agnew, Upland Kenya Wild Flowers: 638 (1974); *Coleus igniarius* Schweinf., Beitr. Fl. Aethiopiens: 121 (1867). Type: Ethiopia, Gondar Region, "auf

4000' hohen Bergen bei Dehli-Dikeno", 23 X 1854, *Schimper* (B holotype destroyed). Neotype: Ethiopia, Gondar Region, "4000' ... über meer auf Bergen Dehli Dikeno", 23 X 1854, *Schimper* 1623 (P neotype designated here; C photo of neotype).

P. malinvaldi Briq., Bull. Herb. Boissier 2: 125 (1894); *Coleus malinvaldi* (Briq.) Briq., Annuaire Conserv. Jard. Bot. Genève 2: 240 (1898), **synon. nov.** Type: Ethiopia, Gondar Region, "Dehli Dikeno", 23 X 1854, *Schimper* 529 (G-DC lectotype designated here; FT, P isotypes; C photo of lectotype).

Coleus de-gasparisianus Buscal. & Muschl., Bot. Jahrb. Syst. 49: 487 (1913), (as *C. De Gasparisianus*), **synon. nov.** Type: "Grassteppe am Ufer des Mbusi" (Manica e Sofala in Mozambique; but in reality probably from Mahio in Haddes Valley, Eritrea), "14 XII 1909", *von Aosta* 151 (B holotype destroyed). Neotype: Eritrea, Vallé Arrot, au sud de Aidereso, 4 IV 1892, *Schweinfurth & Riva* 1398 (FT neotype designated here; BR, G, P, S isoneotypes; C photo of neotype).

Coleus erythraeae Schweinf. ex Loes. & Schltr., Bot. Jahrb. Syst. 53: 372 (1915), nom. nud.

Coleus guidottii Chiov., Atti Reale Accad. Italia, Mem. Cl. Sci. Fis. 11 (2): 54 (1940), **synon. nov.** Type: Eritrea, "Habab, Cub-Cub presso Nacfa", III 1936, *Guidottii* 776 (FT holotype; C photo.).

2. *Coleus helenae*

Buscalioni & Muschler (1913) claimed that the type of *C. helenae* was collected in the swamps at Lake Bangweulu in Zambia, but only few *Plectranthus* species grow in this type of damp habitats. According to Loesener & Schlechter in Engler *et al.* (1915), the plant was removed from *Schweinfurth & Riva* 1182 (from near Sageneti in Eritrea). They regarded this collec-



Coleus De Gasparisianus
Buscal. e Muschler.



Coleus Helenae Buscal. e Muschler.

Fig. 1. Published and unpublished proofs in the herbarium BR with illustrations of species described by Buscalioni & Muschler (1913). Magnification: x 0.68. **Left:** *Coleus de-gasparisianus*. A: habit. B: Flower. C: Calyx. D: stamen. **Right:** *C. helenae*. A: habit. B: flower. The illustration to the right was published by Piscicelli (1913).

tion as conspecific to *P. ghindanus* Schweinf. ex Baker. This species is now commonly known under the older name *P. tenuiflorus* (Vatke) Agnew, but according to Ryding & Paton (submitted), it should be known as *P. aegyptiacus* (Forssk.) C. Chr. The presently available material of Schweinfurth's & Riva's collection (at G-BOIS) is mixed, consisting of a flowering plant of *P. lanuginosus* and some plants of *P. tenuiflorus* with mature fruiting calyces. Buscalioni's & Muschler's (1913) description matches *P.*

lanuginosus better than *P. tenuiflorus*. It mentions that the plant has long-petiolate leaves and short pedicels, and does not mention the hall-mark of *P. tenuiflorus*, the long stamens that protrude well beyond the lower lip of the corolla. The plant on the proof in BR (Fig. 1 Right) is similar to *P. lanuginosus* and rather different from *P. tenuiflorus*. Unlike *P. tenuiflorus*, its has long petioles, no peduncles in the cymes, rather short pedicels and the stamens not or only very slightly longer than the lower

lip of the corolla. In the drawing, the corolla tube appears to be straight and to have a hump on the dorsal side. No *Plectranthus* are known to have such a hump and the drawing is probably slightly incorrect. However, the hump in the drawing resembles the spur-like outgrowth in the strongly bent corolla-tubes of *P. lanuginosus*. Neither, *P. tenuiflorus* nor *P. lanuginosus* are known from the area near Lake Bangweulu in Zambia, and neither of the two species grows in damp habitats. It remains uncertain whether Muschler's type of *C. helenae* consisted of *P. lanuginosus*, *P. tenuiflorus* or was a mixture of both these species. Fortunately, both the species epithets "*lanuginosus*" and "*tenuiflorus*" have priority to "*helenae*". Mixed collections, such as Schweinfurth & Riva 1182 (from which Muschler is supposed to have removed his type material) are not well suited to serve as neotypes. A collection of *P. lanuginosus*, Schweinfurth & Riva 1184, that was collected in a neighbouring locality a few days later, is here selected as neotype of *P. helenae*.

Conspectus of present taxonomy:

Plectranthus lanuginosus (Hochst. ex Benth.) Agnew,

Fl. Upland Kenya: 638 (1974); *Coleus lanuginosus* Hochst. ex Benth. in DC., Prodr. 12: 79 (1848). Type: Ethiopia, Tigray Region, Adua, Schimper III/1915 (K lectotype; BM, FI, KIEL, P, UPS isolectotypes; C photo of the lectotype).

Coleus helenae Buscal. & Muschl., Bot. Jahrb. Syst. 49: 487 (March 1913); Buscal. & Muschl. in Piscicelli, Reg. Laghi equat.: 124, Fig. at p. 125 (November 1913), **synon. nov.** Type: "Sümpfe am Banguelo-See," (Zambia, Northern Region; but in reality probably from Mai Golgol near Segeneti in Eritrea), "8 III 1910", von Aosta 862 (B holotype destroyed). Neotype: Eritrea, Sageneti, cote du nord vers Selet, 12 III 1892, Schweinfurth & Riva 1184 (FT neotype

designated here; BR, K, P isoneotypes; C photo of neotype).

There are additional synonyms in Ethiopia and Somalia.

3. *Geniosporum helenae*

Buscalioni & Muschler (1913) placed *G. helenae* in Lamiaceae, but their description suggests that it may belong to a different family. Loesener & Schlechter in Engler *et al.* (1915) identified the plant as *Hebenstretia polystachya* Harv. ex Rolfe (Selaginaceae or Scrophulariaceae s. lat.). Roessler (1979) does not mention *G. helenae* in revision of *Hebenstretia*, but includes *H. polystachya* in *H. oetesii* Rolfe subsp. *oetesii*. The plant on the proof from BR (Fig. 2 Left) is definitely a *Hebenstretia*, but it differs from the serrate-leaved Southern African *H. oetesii* by having remotely serrate to entire leaves. The illustrated plant is definitely more similar to the widespread tropical to Southern African *H. angolensis* Rolfe that usually has a similar leaf margin. According to Buscalioni & Muschler (1913), *G. helenae* was collected near the Buzi River (below 500 m in Mozambique). Loesener & Schlechter in Engler *et al.* (1915) apparently distrusted this information, perhaps because the genus *Hebenstretia* is not known from such low altitudes in tropical Africa, but they could not establish its origin with certainty.

4. *Lasiocorys de-gasparisiana* ("L. De Gasparisiana")

Buscalioni & Muschler (1913) claimed that the type of *L. de-gasparisiana* was collected at the "Mbusi River" (the Buzi River in Mozambique). Loesener & Schlechter in Engler *et al.* (1915) apparently distrusted this information but could not establish its origin with certainty. They identified it as *Leucas nyassae*, and I agree with Sebald (1980: 163-164) that the plant on the proof from BR (Fig. 2 Right) belongs to the same species (and to the var. *nyassae*). However,

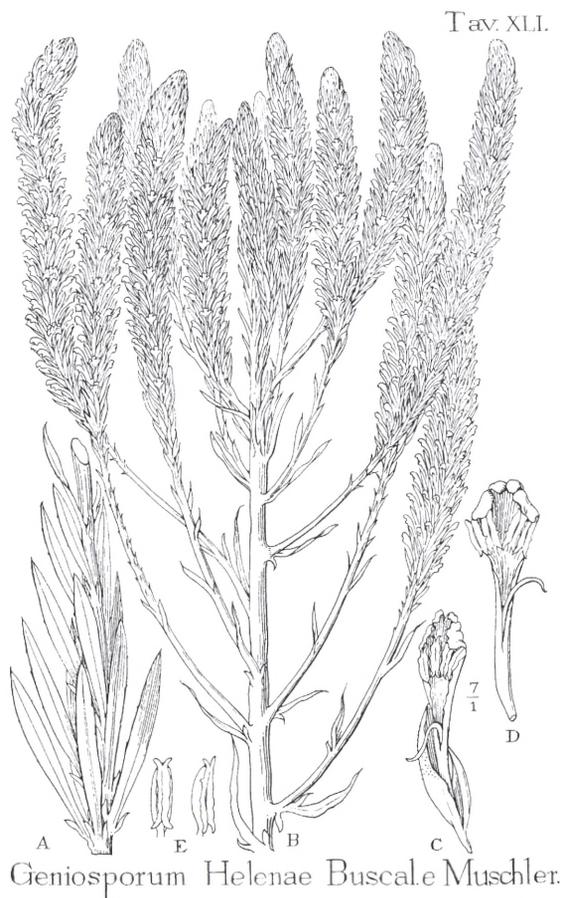


Fig. 2. Unpublished proofs in the herbarium BR with illustrations of species described by Buscalioni & Muschler (1913). Magnification: x 0.68. **Left:** *Geniosporum helenae*. A: part of a shoot. B: habit. C: flower. D: corolla. E: anthers. **Right:** *Lasiocorys de-gasparisiana*. A: habit. B: calyx.

Buscalioni's & Muschler's (1913) description may match many *Leucas* species but hardly *L. nyassae*. Whereas *L. nyassae* is an up to 1 m tall herb with 40-80-flowered verticillasters, the description mentions that *L. de-gasparisiana* is a c. 1.5 m tall shrub with 10-12-flowered verticillasters. There is obviously a conflict between the different sources of information, but when all the available data is taken into consideration, it seems more probable that the lost type of *L. de-gasparisiana* belonged to *L. nyassae* than that it belonged to the unknown species of the

description. Hence, Muschler may have confused the plant material. According to Sebald (1980: 47, 163-165), *L. nyassae* is not known from the Buzi River in Mozambique, but has been recorded from neighbouring parts of Zimbabwe, not very far from this river. In the absence of more reliable sources of information on the provenance of the type material, I have designated a collection from the latter country as neotype of this name.

Conspectus of present taxonomy:

Leucas nyassae Gürke,

Bot. Jahrb. Syst. 22: 137 (1895); Sebald, Stuttgarter Beitr. Naturk. Ser. A. 341: 163 (1980). Type: Malawi, Southern Region, "Shire Highlands", *Buchanan* 255 (K syntype); "Shire Highlands", *Buchanan* 460 (K syntype).

var. *nyassae*

Lasiocorys de-gasparisiana ("L. De Gasparisiana" Buscal. & Muschl., Bot. Jahrb. Syst. 49: 483 (1913). Type: "Steppe am Mbusi-Fluß (Mossambik)" (Manica e Sofala Region in Mozambique; but in reality probably from elsewhere), "7 VII 1909", *von Aosta* 82 (B holotype destroyed). Neotype: Zimbabwe, Central Region, Salisbury District, Lake Mac Ilwaine near Game Park, 21 III 1963, *Loveridge* 619 (K neotype designated here; SRGH isoneotype not seen; C photo of neotype).

A complete list of synonyms has been provided by Sebald (1980).

5. *Ocimum superbum*

Buscalioni & Muschler (1913) claimed that the type of *Ocimum superbum* was collected in Zambia, and gave a description that matches *O. gratissimum* L. They mentioned that the plant was 3 m tall, has hairs simple and leaves acute or subacute at the apex and attenuate at the base. On the basis of this evidence, Paton (1992) placed *O. superbum* as a synonym under *O. gratissimum*. However, according to Loesener & Schlechter in Engler *et al.* (1915), the plant was removed from the collection *Schweinfurth* 1199 from Yemen, and belonged to *O. cylindrostachys* Schweinf. The latter name has not been validly published, but *Schweinfurth* 1199 and other collections identified by that name (*e.g.* by Schwartz 1939) belong to *O. spicatum*. The plant on the proof from BR (Fig. 3 Left) is very similar to *O. spicatum*. Unlike *O. gratissimum* and in conflict with Buscalioni's &

Muschler's (1913) description, it has obtuse leaves with a cuneate base. Whereas *O. gratissimum* has simple hairs only, the illustrations hint that the type plant had branched hairs. The very dense inflorescences, strongly recurved calyces with the upper lip pointing straight downwards are more typical of *O. spicatum*. There is obviously a conflict between the different sources of information, but when all the available information is taken into consideration, it seems more probable that the lost type of *O. superbum* belonged to *O. spicatum* than that it belonged to *O. gratissimum*. If the latter conclusion is correct, Muschler seems to have confused the plant material. *O. spicatum* is not known from Zambia, and a duplicate of the collection from Yemen, from which the type material was said to have been removed, is here selected as a neotype of *O. superbum*.

Conspectus of present taxonomy:

Ocimum spicatum Defflers,

Bull. Soc. Bot. Fr. 43: 226 (1896). Type: Yemen, Jabal Masna'ah, 17 IV 1890, *Defflers* 599 (K lectotype, P isolectotype, C photo of isolectotype).

O. superbum Buscal. & Muschl., Bot. Jahrb. Syst. 49: 488 (March 1913); Buscal. & Muschl. in Piscicelli, Reg. Laghi equat. 134, Fig. at p. 135 (November 1913), **synon. nov.** Type: "Baumsteppe zwischen Buana Mukuba und Sekontui, 1200 m ü. M." (Central Region in Zambia; but in reality probably from Wabi Chnoiet in Yemen), 26 I 1910, *von Aosta* 421 (B holotype destroyed). Neotype: Yemen, Wadi Chnoiet, 1889, *Schweinfurth* 1199 (G-BOIS neotype designated here, C photo of neotype).

O. cylindrostachys Schweinf. ex Loes. & Schltr., Bot. Jahrb. Syst. 53: 372 (1915), nom. nud.; O. Schwartz, Fl. trop. Arab.: 231 (1939), nom. nud.

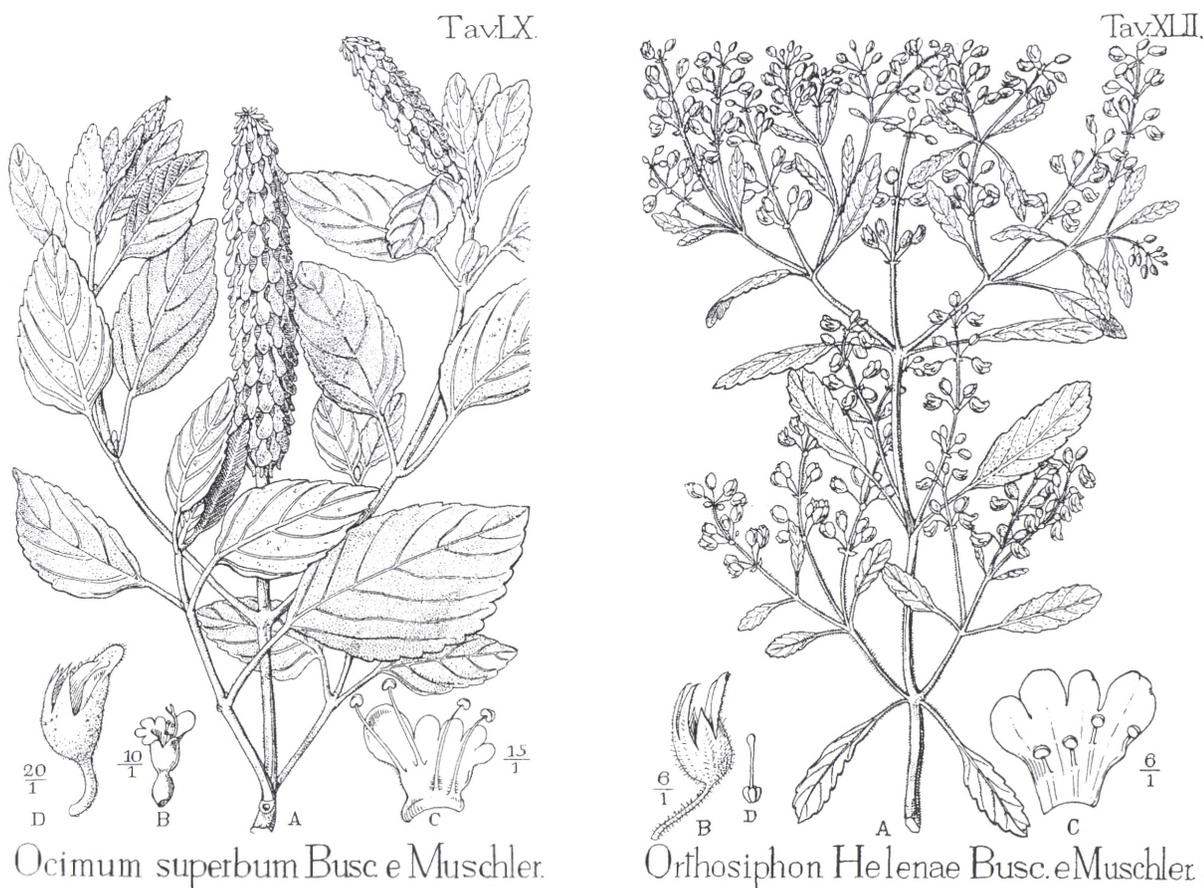


Fig. 3. Proofs in the herbarium BR with illustrations of species described by Buscalioni & Muschler (1913). Magnification: x 0.68. **Left:** *Ocimum superbum*. A: habit. B: corolla. C: dissected flower. D: fruiting? calyx. **Right:** *Orthosiphon helenae*. A: habit. B: calyx. C: dissected flower. The two illustrations were published by Piscicelli (1913).

6. *Orthosiphon helenae*

Buscalioni & Muschler (1913) claimed that the type of *O. helenae* was collected at Broken-Hill in Zambia, but according to Loesener & Schlechter in Engler *et al.* (1915), the plant was removed from Schweinfurth 820 that was collected in Okeber (Yemen). Schweinfurth's collection was identified as *O. melhanensis* Schweinf., but this name has not been validly published. As mentioned by Wood (1997), the correct name of this species is *Endostemon gracilis*. The presently available material of Schweinfurth's collection belongs to the Arabian form of this

species, a form that is characterised by having comparatively narrow leaves. The same apparently also applies to the illustration of *O. helenae* on the proof from BR (Fig. 3 Right). Buscalioni's & Muschler's (1913) statement that *O. helenae* is annual or biennial, provides some additional support to believe that it belonged to *E. gracilis*. *E. gracilis* is not known from Zambia, and as far as known, the African material of this species differs from the illustrated plant in having broader leaves. Hence, a duplicate of Schweinfurth's Arabian collection, from which Muschler is believed to have removed the type

material, is here selected as neotype of *O. helenae*.

Conspectus of present taxonomy:

Endostemon gracilis (Benth.) M. Ashby, J. Bot. 74: 127 (1936); A.J. Paton *et al.*, Kew Bull. 49: 701 (1994); J.R.I. Wood., A Handbook of the Yemen Flora: 247 (1997); *Ocimum gracile* Benth., Labiat. gen. spec.: 12 (1832). Type: Zanzibar, *Bojer* s.n. (K lectotype).

Orthosiphon helenae Buscal. & Muschl., Bot. Jahrb. Syst. 49: 490 (1913); Buscal. & Muschl. in Piscicelli, Reg. Laghi equat.: 130, Fig. at p. 131 (1913), **synon. nov.** Type: "Steppe bei Broken Hill" (Central Region in Zambia; but in reality probably from Okeber in Yemen), "12 I 1910", *von Aosta* 284 (B holotype destroyed). Neotype: Yemen, Okeber, am Gebel Melhan, 28 I 1889, *Schweinfurth* 820 (G-BOIS neotype designated here, B isoneotype destroyed, C photo of neotype).

Orthosiphon melhanensis Schweinf. ex Loes. & Schltr., Bot. Jahrb. Syst. 53: 372 (1915), nom. nud.; O. Schwartz, Fl. trop. Arab.: 232 (1939), nom. nud.

Additional synonyms have been given by Paton *et al.* (1994: 701).

7. *Orthosiphon de-gasparisianus* ("O. De Gasparisianum")

Buscalioni & Muschler (1913) claimed that the type of *O. de-gasparisianus* was collected in Zambia, but according to Loesener & Schlechter in Engler *et al.* (1915), the plant was removed from the collections *Schweinfurth* 244 and/or 278, both from Eritrea and identified as *O. erythraeum* Schweinf. However, the latter name has not been validly published, and is not known to have applied to other herbarium specimens. No duplicates of these collections

have been found, and the latter name was never published or found on any herbarium labels. Fortunately, the habit illustration (Fig. 4 Left) is unmistakable, showing a plant belonging to *Endostemon tereticaulis*; but the flower is slightly atypical showing a divided upper lip. The species is widespread in tropical Africa but not known from Zambia. A neotype is here selected among material of *E. tereticaulis* from Eritrea, the country from which the original material is believed to have originated.

Conspectus of present taxonomy:

Endostemon tereticaulis (Poir) M. Ashby, J. Bot. 74: 129 (1936); A.J. Paton *et al.*, Kew Bull. 49: 711 (1994); J.R.I. Wood., A Handbook of the Yemen Flora.: 247 (1997); *Ocimum tereticaule* Poir. in Lam., Encycl. suppl. 1: 592 (1811). Type: West Tropical Africa, *Herb. Desfontaines*.

Orthosiphon de-gasparisianum Buscal. & Muschl., Bot. Jahrb. Syst. 49: 490 (March 1913); Buscal. & Muschl. in Piscicelli, Reg. Laghi equat.: 132, Fig. at p. 133 (November 1913), **synon. nov.** Type: "Baumsteppe bei Broken Hill, 1000 m ü. M." (Central Region in Zambia; but in reality probably from near Ginda in Eritrea), "12 I 1910", *von Aosta* 282 (B holotype destroyed). Neotype: Eritrea, Nefasit, at the base of Mt. Bizen, just above the town, 25 XI 1989, *Ryding et al.* 2035 (UPS neotype designated here, ASMU, ETH isoneotypes; C photo of neotype).

Orthosiphon erythraeum Schweinf. ex Loes. & Schltr., Bot. Jahrb. Syst. 53: 372 (1915), nom. nud.

Additional synonyms have been provided by Paton *et al.* (1994: 771).

8. *Plectranthus emanueli*

Buscalioni & Muschler (1913) claimed that the

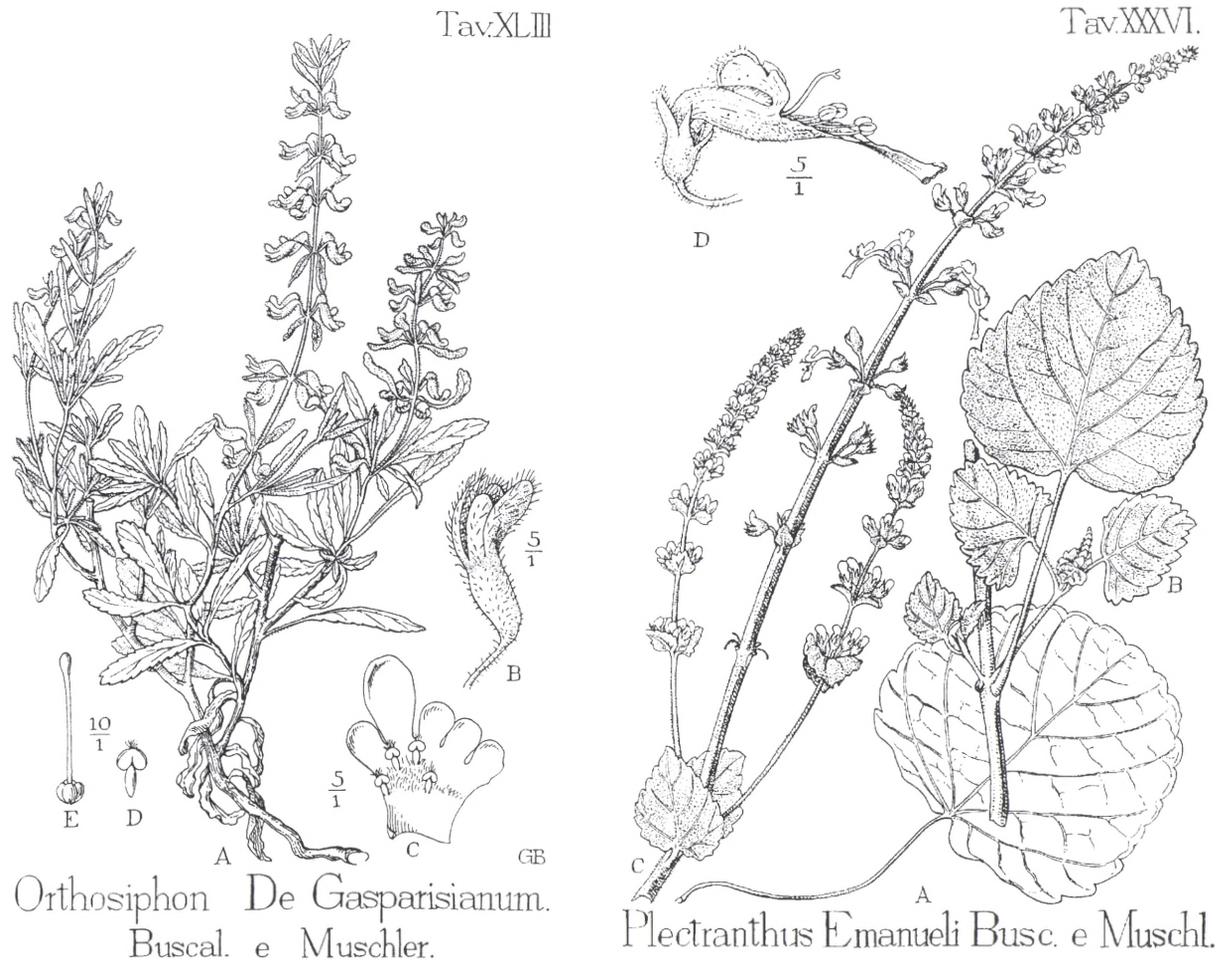


Fig. 4. Proofs in the herbarium BR with illustrations of species described by Buscalioni & Muschler (1913). Magnification: x 0.68. **Left:** *Orthosiphon de-gasparisianus*. A: habit. B: fruiting calyx. C: dissected flower. D: anther. E: pistil. **Right:** *Plectranthus emanueli* (right): A, leaf; B, part of shoot; C, inflorescence; D, flower. Slightly modified versions of the two illustrations were published by Piscicelli (1913).

type of *P. emanueli* was collected in Kenya, but Loesener & Schlechter in Engler *et al.* (1915) stated that this plant was removed from Schweinfurth's herbarium and is conspecific to *P. hadiensis* (Forssk.) Schweinf. ex Sprenger. However, other information on this plant suggests that it was more similar to *P. longipes* than to *P. hadiensis*. The description in Buscalioni & Muschler (1913) is rather uninformative, but

disagrees with *P. hadiensis* in mentioning that *P. emanueli* has bracts. The drawing of *P. emanueli* (Fig. 4 Right) is more similar to *P. longipes* than to *P. hadiensis*. The illustrated plant resembles *P. longipes* (at least the material from Eritrea) in having both the upper and the lower lips of the corolla rather long; the stamens much shorter than the lower lip; bracts persistent; and the leaf blades being slightly notched at the peti-

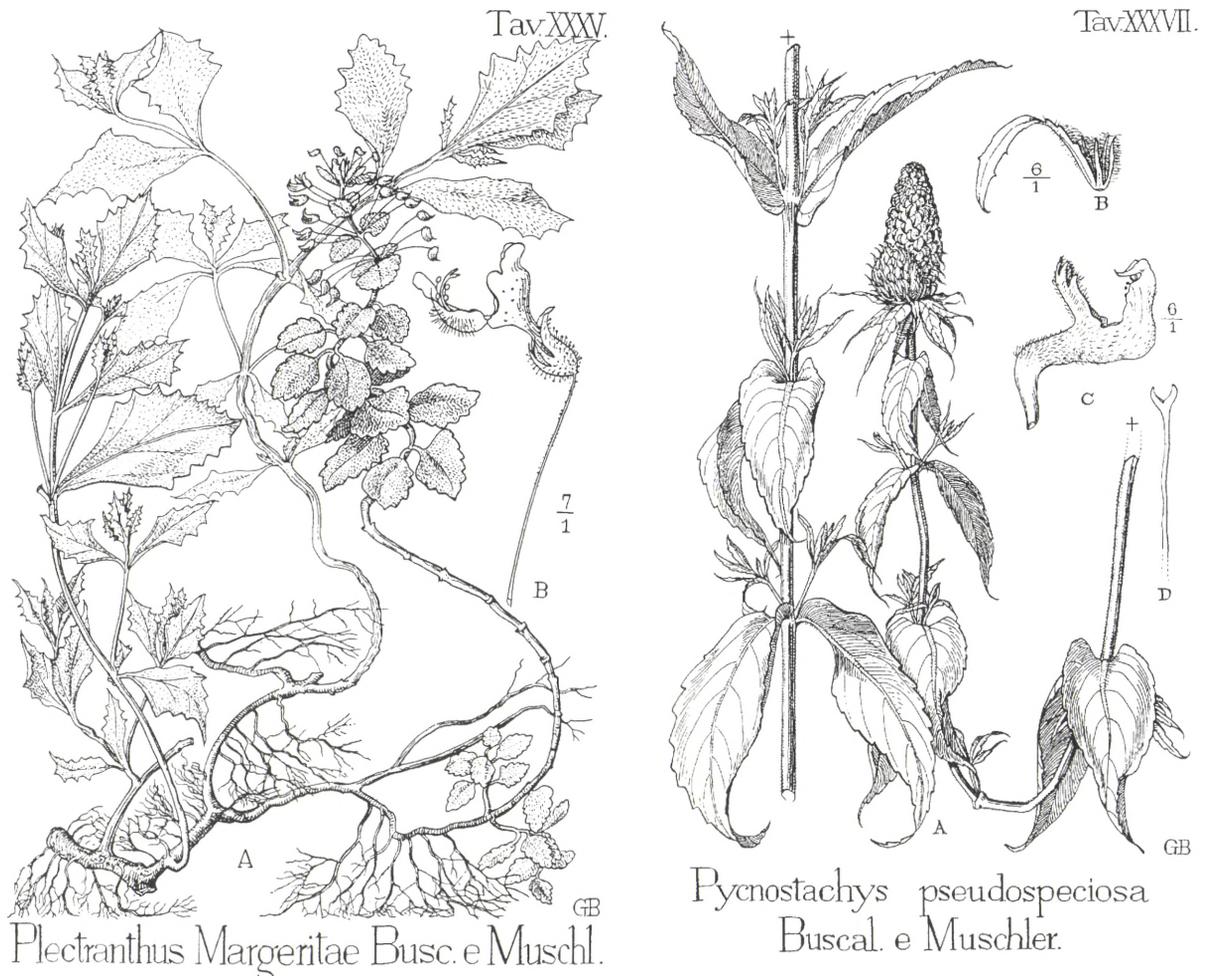


Fig. 5. Proofs in the herbarium BR with illustrations of species described by Buscalioni & Muschler (1913). Magnification: x 0.68. **Left:** *Plectranthus margeritae*. A: habit. B: flower. **Right:** *Pycnostachys pseudospeciosa*. A: habit. B: bract? C: corolla. D: upper part of style. Slightly modified versions of the two illustrations were published by Piscicelli (1913).

ole. *P. hadiensis* has the upper lip of the corolla slightly shorter; the stamens up to almost as long as the lower lip of the corolla; bracts usually early deciduous; and leaves slightly attenuate and not notched near the petiole. The three collections Cufodontis 359, 417 and 712 at FT, identified as *P. emanueli* by Lanza (1939), belong to *P. longipes*. However, it is uncertain whether Lanza had seen the type of *P. emanueli*. He might have compared his plants with the

illustration in Piscicelli (1913). *P. longipes* is known from Kenya, but if Loesener & Schlechter in Engler *et al.* (1915) are right in that the plant comes from Schweinfurth's herbarium, it seems to be more probable that the type material comes from Eritrea. According to Cufodontis (1963), the type was collected by Schweinfurth in Eritrea and cultivated in Hortus Panormitano (in Palermo, Italy), but this material has not been traced by

the author. It might also have been removed from the Berlin isotype of *P. longipes* (Schweinfurth 178). In order to avoid attaching two names to the same collection, the neotype of *P. emanueli* has been selected among other material of *P. longipes* from Eritrea.

Conspectus of present taxonomy:

***Plectranthus longipes* Baker**

in Dyer., Fl. trop. Afr. 5: 406 (1900). Type: Eritrea, Ginda, 17 II 1891, Schweinfurth 178 (K holotype; C photo.).

Coleus emanueli Buscal. & Muschl., Bot. Jahrb. Syst. 49: 484 (March 1913); Buscal. & Muschl. in Piscicelli, Reg. Laghi equat. 472, Fig. at p. 473 (November 1913), **synon. nov.** Type: "Tal des Guasso Nyiro" (Kenya; but in reality perhaps from elsewhere), "22 XI 1910", von Aosta 1558 (B holotype destroyed). Neotype: Eritrea, Nefasit, at the base of Mt. Bizen, just above the town, 25 XI 1989, Ryding *et al.* 2034 (UPS neotype designated here; ASMU, ETH isoneotypes; C photo of neotype).

9. *Plectranthus margeritae*

Buscalioni & Muschler (1913) claimed that the type of *P. margeritae* was collected at Neumann's Camp NE of Mt Kenya, but in Piscicelli (1913) it was stated that it comes from near Marsabit, c. 200 km north of this site, and Loesener & Schlechter in Engler *et al.* (1915) stated that the plant was removed from Schweinfurth 282 from Yemen, and identified as *P. quadridentatus*. *P. quadridentatus* is conspecific to *P. prostratus*, a species that is only known from Africa, but the name has also been applied for the Arabic *P. arabicus* E.A. Bruce. The collection Schweinfurth 282, that was identified as *P. quadridentatus*, is sterile. Apart from having atypically large leaves, it is very similar to *P. arabicus*, but due to the absence of flowers and fruits I cannot confirm the identification by Loesener's &

Schlechter (1915) with complete certainty. The question of the identity of *P. margeritae* seems to be more complicated than suggested by Loesener & Schlechter in Engler *et al.* (1915). The abundance of adventitious roots in the illustrated plant (Fig. 5 Left) agrees better with the prostrate *P. prostratus* than with the usually more upright *P. arabicus*. Buscalioni & Muschler (1913) claim that their species is heterophyllous, and that also applies to the plant on the proof from BR (Fig. 5 Left). One part of the illustrated plant has large sessile and pinnatifidly lobed leaves, and is very similar to the collection Schweinfurth 282; the other part has smaller petiolate and only shallowly crenate leaves, and is very similar to the characteristic African *P. prostratus*. *P. arabicus* and *P. prostratus* are closely related and perhaps not very distinct, but as far as known, the leaves of the two species are not very variable within the same plants. However, according to A. Paton (pers. com.), a related species from coastal Kenya seems to have the leaves larger on sterile shoots, and heterophyly could perhaps occur in *P. prostratus* as well. When all available information is taken into consideration, it cannot be decided whether the type of *P. margeritae* belonged to *P. arabicus*, to *P. prostratus*, or was mixed and contained material from both these species. The species epithet *margeritae* is older than *arabicus* but younger than *prostratus*. In order to avoid unnecessary name changes, I prefer to attach the name (*P. margeritae*) to *P. prostratus*. The latter species is known from Kenya, but I have seen no material from the localities mentioned by Buscalioni & Muschler (1913) or in Piscicelli (1913). As many of Muschler's collections seem to have been removed from Schweinfurth's herbarium, it is perhaps more probable that this part of the type originates from Eritrea where Schweinfurth has collected the type of *P. quadridentatus* (synonym of *P. prostratus*). In order not to attach two names to the same collection, the

neotype of *P. margeritae* has been selected among other material of *P. prostratus* from Eritrea.

Conspectus of present taxonomy:

***Plectranthus prostratus* Gürke,**

Bot. Jahrb. Syst. 19: 206 (1894). Types: Tanzania, Pare Distr., "Kilimandscharogebiet, am fuß der Nashornhügel am Panganiübergang", *Volkens* 484 (B syntype destroyed); North Mara Distr., Ukira, *Fischer* 497 (B syntype destroyed).

P. quadridentatus Schweinf. ex Baker in Dyer., Fl. trop. Afr. 5: 409 (1900). Type: Eritrea, Mt. Alam Kale, NW of Aidereso, 5 IV 1892, *Schweinfurth* & *Riva* 2086 (K holotype; FT, P isotypes).

P. margeritae Buscal. & Muschl., Bot. Jahrb. Syst. 49: 485 (March 1913); Buscal. & Muschl. in Piscicelli, Reg. Laghi equat.: 470, Fig. at p. 471 (November 1913), **synon. nov.** Type: "Neumann-Camp" (Northern Frontier Region in Kenya; but in reality probably mixed with one part from E or NE Africa and one from Gebel Bura in Yemen), "11 I 1911", *von Aosta* 1688 (B holotype destroyed). Neotype: Eritrea, Nefasit, at the base of Mt. Bizen, just above the town, 30 XII 1989, *Ryding et al.* 2095 (C neotype designated here, ASMU, ETH, UPS isoneotypes).

10. *Pycnostachys pseudospeciosa*

Buscalioni & Muschler (1913) claimed that the type of *P. pseudospeciosa* was collected at Lake Bangweulu in Zambia, and there is a fragment from this plant in the Kew Herbarium (K). Loesener & Schlechter in Engler *et al.* (1915) did not include this species in their list of corrections. In her revision of *Pycnostachys*, Bruce (1939) recognised *P. pseudospeciosa* as the correct name of a distinct species. The plant on the proof in BR (Fig. 5 Right) can be identified as *P. pseudospeciosa*, and this confirms Bruce's (1939) application of the name. The species is

indeed known from the area near Lake Bangweulu, and the type plant may well have been collected on the Duchess of Aosta's expedition, but the collection number (1002) was probably added by Muschler. However, in the light of all the irregularities, doubt may also be attached to the provenance of this type collection.

Conspectus of present taxonomy:

***Pycnostachys pseudospeciosa* Buscal. & Muschl.,**

Bot. Jahrb. Syst. 49: 486 (March 1913); Buscal. & Muschl. in Piscicelli, Reg. Laghi equat.: 258, Fig. at p. 259 (November 1913); Bruce, Bull. Misc. Inform. 1939: 584 (1939). Type: Zambia, Northern Region, "steppe, am Banguelo-See, 1300 m ü. M.", 23 III 1910, *von Aosta* 1002 (B holotype destroyed, K lectotype, designated here, C photo of lectotype).

11. *Sabaudia helenae*

Buscalioni & Muschler (1913) described the new genus *Sabaudia* and claimed that the type of the single species, *S. helenae*, was collected in Zambia, but according to Loesener & Schlechter in Engler *et al.* (1915), the plant was removed from the collection *Schweinfurth* 491 from Yemen. Chiovenda (1917) recognised *Sabaudia* as a distinct genus, and included two more species (*S. atriplicifolia* (Benth.) Chiov. and *S. erythraeae* Chiov.). He also recognised *S. helenae* as distinctly differing from the other two species by having bracteoles at the base of the calyces. Apart from having bracteoles, the illustration of *S. helenae* in Piscicelli (1913) is very similar to the Arabian *S. atriplicifolia* and is not very different from the *S. erythraeae* from Eritrea. As there are no other records of *Sabaudia* (and the related *Lavandula*) from Zambia and the neighbouring countries, it seems unlikely that the type of *S. helenae* should originate from this part of Africa. It is also uncertain whether the alleged difference between *S. helenae*

nae and *S. atriplicifolia* is consistent or significant enough to justify the separation of *S. helenae* as a different species. In recent works, the genus *Sabaudia* is included in *Lavandula*. A decision on the systematic status of *S. helenae* will be made by Dr. T. Upson (unpubl.) in connection with a revision of *Lavandula*.

Acknowledgements

Study visits have been made to the herbaria BM, BR, FT, HBG, K, P, S and UPS (abbreviations according to Holmgren *et al.* 1990). Material from some of these herbaria and G, G-BOIS, G-DC has been obtained on loan. B, FT, M, NY, US, WU, Z, ZT were consulted in the search for lost type material or photos of such material, but no material was found. Duplicates of some of the cited collections have been deposited in ASMU (the herbarium of Asmara University, Eritrea) and ETH. Prof. E. Robbrecht (at BR) has kindly provided me with copies of letters and allowed me to publish proofs of plant illustrations deposited in BR. I wish to thank the directors and curators of all these herbaria. I am also indebted to Dr A. Paton (at K) for critically reading and providing valuable suggestions to improvement of my manuscript.

References

- Bruce, E.A. 1939. The genus *Pycnostachys*. *Bull. Misc. Inform.* **1939**: 563-593.
- Buscalioni, L. & Muschler, R. 1913. Beschreibung der von Ihrer Königlichen Hoheit der Herzogin Helena von Aosta in Zentral-Afrika gesammelten neuen Arten. *Bot. Jahrb. Syst.* **49**: 457-515.
- Chiovenda, E. 1916. Di una questione di nomenclatura a proposito di un genere di Labiate. *Boll. Soc. Bot. Ital.* **1916**: 57-62.
- Chiovenda, E. 1917. Plantae Novae vel minus notae e regione aethiopica. *Boll. Soc. Bot. Ital.* **1917**: 53-61.
- Croix, I. la & Cribb, P.J. 1998. Orchidaceae (part. 2). In: Pope, G.V. (ed.), *Flora Zambesiaca*. Vol. 11, 2. Royal Botanic Gardens, Kew.
- Cufodontis, G. 1962. Enumeratio Plantarum Aethiopiae Spermatophyta (Sequentia). *Bull. Jard. Bot. État* **32**, suppl.: 773-827.
- Cufodontis, G. 1963. Enumeratio Plantarum Aethiopiae Spermatophyta (Sequentia). *Bull. Jard. Bot. État* **33**, suppl.: 830-876.
- Cufodontis, G. 1964. Enumeratio Plantarum Aethiopiae Spermatophyta (Sequentia). *Bull. Jard. Bot. État* **34**, suppl.: 925-978.
- Cufodontis, G. 1965. Enumeratio Plantarum Aethiopiae Spermatophyta (Sequentia). *Bull. Jard. Bot. État* **35**, suppl.: 979-1058.
- Cufodontis, G. 1966. Enumeratio Plantarum Aethiopiae Spermatophyta (Sequentia). *Bull. Jard. Bot. État* **36**, suppl.: 1059-1114.
- Cufodontis, G. 1967. Enumeratio Plantarum Aethiopiae Spermatophyta (Sequentia). *Bull. Jard. Bot. État* **37**, suppl.: 1115-1193.
- De Wildeman, E. & Muschler, R. 1913. Compositae Congolanae Novae. *Bull. Soc. Roy. Bot. Belgique* **49**: 217-246.
- Engler, A., Diels, F.L.E., Gilg, E.F., Graebner, P., Harms, H., Lindau, G., Loesener, T., Schlechter, R. & Volkens, G.L.A. 1915. Berichtigungen zu den von R. Muschler in Engl. Bot. Jahrb. XLIII. (1909), XLVI. (1911), XLIX. (1913) und L. Suppl. (1914) veröffentlichten Diagnosen afrikanischer Pflanzen. *Bot. Jahrb. Syst.* **53**: 366-375.
- Friis, I. & Jellis, S. 1984. A synopsis of *Pouzolzia* Gaud. (Urticaceae) in tropical Africa, with an identification of *P. erythraea* and *P. piscicelliana*. *Kew Bull.* **39**: 587-601.
- Gilg, E. & Benedict, C. 1915. Monographische Zusammenstellung sämtlicher Capparidaceae des tropischen und subtropischen Afrika. *Bot. Jahrb. Syst.* **53**: 144-274.
- Greuter, W., McNeill, J., Barrie, F.R., Burdet, H.M., Demoulin, V., Filgueiras, T.S., Nicolson, D.H., Silva, P.C., Skog, J.E., Treharne, P., Turland, N.J. & Hawksworth, D.L. 2000. *International Code of Botanical Nomenclature (Saint Louis Code)*. Koeltz Scientific Books, Königstein.
- Holmgren, P.K., Holmgren, N.H. & Barnett, L.C. 1990. Index Herbariorum, part I: The Herbaria of the World, ed. 8. *Regnum Veg.* **120**. New York Botanic Garden, New York.
- Jeffrey, C. 1995. Cucurbitaceae. In: Edwards, S., Mesfin Tadesse & Hedberg, I. (eds.), *Flora of Ethiopia and Eritrea*. Vol. 2, 2. Addis Abeba & Uppsala. Pp. 17-59.
- Lanza, D. 1939. Labiatae. In: Zavattari, E. (ed.), *Missione Biologica nel paese dei Borana*. Vol. 4. *Raccolte botaniche. Embryophyta Siphonogame (Angiospermae-Gymnospermae)*. Reale Accademia D'Italia, Roma. Pp. 182-189.
- Moore, S.Le M. 1914. Alabastra diversa – Part. XXIII. I. Vernoniaceae africanae novae. *J. Bot.* **52**: 89-98.
- Muschler, R. 1906. Beiträge zur Flora Nordostafrikas und der Nachbargebiete. I. *Feddes Repert. Spec. Nov. Regni Veg.* **3**: 212-214.

- Muschler, R. 1907a. Labiatae siamensis novae quas descripsit Reno Muschler. *Feddes Repert. Spec. Nov. Regni Veg.* **4**: 268-271.
- Muschler, R. 1907b. Beitrag zur Kenntnis der Flora vor "el-Tor" (Sinai Halbinsel). *Verh. Bot. Vereins Prov. Brandenburg* **49**: 66-146.
- Muschler, R. 1907-1908. Die Gattung *Coronopus* (L.) Gaertn. *Bot. Jahrb. Syst.* **41**: 111-147.
- Muschler, R. 1909. Systematische und pflanzengeographische Gliederung der afrikanischen *Senecio*-Arten. *Bot. Jahrb. Syst.* **43**: 1-74.
- Muschler, R. 1911a. Caryophyllaceae andinae. In: Urban, I., *Plantae novae andinae imprimis Weberbauerianae*. *V. Bot. Jahrb. Syst.* **45**: 441-461.
- Muschler, R. 1911b. Compositae africanae novae. I. *Bot. Jahrb. Syst.* **46**: 51-124.
- Muschler, R. 1911c. Compositae excl. *Helichrysum*. In: Mildbraed, J. (ed.), *Wissenschaftliche Ergebnisse der Deutschen Zentral-Afrika-Expedition 1907-1908 unter Führung Adolf Friedrichs, Herzogs zu Mecklenburg. Band II. Botanik*. Klinkhardt & Biermann, Leipzig. Pp. 346-409.
- Muschler, R. 1912a. *Manual Flora of Egypt. Vol. 1 & 2*. R. Friedlaender & Sohn, Berlin.
- Muschler, R. 1912b. *Solms-Laubachia*. In: Diels, L., *Plantae chinenses Forrestianae. New and imperfectly known species. Notes Roy. Bot. Gard. Edinburgh* **5**: 205-206.
- Muschler, R. 1914. Monographische Übersicht der afrikanischen *Aspilia*-Arten. *Bot. Jahrb. Syst.* **50**, suppl.: 331-342.
- Ortiz, S. & Rodriguez-Oubiña, J. 1996. The identity of *Dicoma banguelensis* (Asteraceae). *Taxon* **45**: 519-520.
- Paton, A. 1992. A synopsis of *Ocimum* L. (Labiatae) in Africa. *Kew Bull.* **47**: 403-436.
- Paton, A., Harley, M.M., Harley, R.M. & Weeks, S. 1994. A revision of *Endostemon* (Labiatae). *Kew Bull.* **49**: 673-716.
- Piscicelli, M. 1913. *Nella regione dei laghi equatoriali*. Libreria Luigi Pierro, Napoli.
- Plesske, H.-M. 1957. *Der die Menschen liebt. Leben und Werk des Dichters Reinhold Conrad Muschler*. Paul Neff Verlag, Wien, Berlin & Stuttgart.
- Roessler, H. 1979. Revision der Gattungen *Hebenstretia* L. und *Dischima* Choisy (Schrophulariaceae-Selagineae). *Mitt. Bot. Staatssamml. München* **15**: 1-160.
- Ryding, O. & Paton, A. (submitted). *Plectranthus algypticus*, the correct name for *P. tenuiflorus* and Forskål's *Ocimum a Zatarhendi* (Labiatae). *Kew Bull.*
- Schubert, B.G. & Troupin, G. 1952. A propos des espèces nouvelles récoltées par la Duchesse Hélène D'Aoste en Afrique Tropicale. *Bull. Soc. Roy. Bot. Belgique* **85**: 5-8.
- Schubert, B.G. & Troupin, G. 1955. Additional notes concerning the new species collected by Hélène, Duchess of Aosta, in Tropical Africa. *Taxon* **4**: 94-95.
- Schwartz, O. 1939. Flora des tropischen Arabien. *Mitt. Inst. Allg. Botanik Hamburg* **10**.
- Schweinfurth, G. 1867. *Beitrag zur Flora Aethiopiens. Erste Abtheilung*. Verlag von Georg Reimer, Berlin.
- Schweinfurth, G. 1915. Dr. Reno Muschlers Fälschungen. *Verh. Bot. Vereins Prov. Brandenburg* **56**: 170-175, 206.
- Sebald, O. 1980. Die Gattung *Leucas* R. Brown (Labiatae) in Africa und auf der Arabischen Halbinsel. *Stuttgarter Beitr. Naturk. Ser. A.* **341**: 1-200.
- Täckholm, V. & Täckholm, G. 1941. *Flora of Egypt. Vol. 1*. Fouad I University, Cairo.
- Veldkamp, J.F. 1968. Revalidation of the African *Biophytum helenae* Busc. & Muschler (Oxalidaceae). *Blumea* **16**: 137-138.
- White, F. 1962. A history of plant collecting in Northern Rhodesia. In: Fernandes, A. (ed.), *Comptes Rendus de la IV^e Réunion Plénière de l'Association pour l'étude taxonomique de la Flore d'Afrique tropicale*. Junta de Investigações do Ultramar, Lisbon. Pp. 175-203.
- White, F. 1983. *The vegetation of Africa*. Unesco, Paris.
- Wood, J.R.I. 1997. *A handbook of the Yemen Flora*. Royal Botanic Gardens, Kew.
- Zepernick, B. & Timler, F.K. 1979. Grundlagen zur 300jährigen Geschichte des Berliner Gartens. *Englera* **1**: 1-303.